ISSN (print) 0093-4666 © 2013. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/123.157

Volume 123, pp. 157–162 *January–March 2013*

New records of lichens from Chile

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Abstract — After fieldwork in central Chile, five lichen species were established as new for the country: *Bryoria lanestris*, *Buellia disciformis*, *Haematomma sorediatum*, *Lecidea capensis*, and *Punctelia rudecta*. They were discovered in two national parks in the Maule Region and the area surrounding the Termas de Chillán, Bío-Bío Region. Each species is briefly described, with habit illustrations and comments on chemistry, habitat, and morphology. These collections suggest a high potential for finding more unreported lichen species in Chile's national parks.

Key words — lichenized fungi, South America, floristic survey, taxonomy

Introduction

In Chile, the climate varies from arid desert in the north, through humid subtropical in Easter Island, to near polar in the south, extending across 38 degrees of latitude. The five species reported here were collected in two national parks with a Mediterranean climate in the central part of Chile. About 1400 lichen species have been previously reported from Chile (Galloway & Quilhot 1998). Our new findings cover only a very small part of the country, but indicate that as it has such a wide range of different climates, many more species may still be discovered, and the total number of lichen species occurring in Chile is likely to be far higher than currently reported.

Materials & methods

The 405 specimens sampled during the current collections are deposited in the Korean Lichen Research Institute, Sunchon National University, South Korea (KoLRI).

The specimens were examined by standard microscopical techniques, hand-sectioned under a Nikon SMZ 645 dissecting microscope. Anatomical descriptions were based on observations under a Nikon Eclipse E200 microscope. Secondary metabolites were identified by TLC according to Elix et al. (1987), Orange et al. (2001), and White & James (1985). Medullas were tested with IKI (10% aqueous potassium iodide) for identification.

Results

Bryoria lanestris (Ach.) Brodo & D. Hawksw. Fig. 1a, b

Thallus fruticose to subpendent, attached to the substrate by one holdfast, surface pale olive brown to pale brown, smooth, 0.2–0.4 mm thick, 1–5 cm long, main branch usually isotomic, with few side branches, surface with white soralia, growing from the fissures, without pseudocyphellae.

Chemistry: Thallus P+ red or P–, medulla P–, soralia C–, K–, P+ red, containing fumarprotocetraric acid (by TLC).

Habitat: On the bark of *Nothofagus* sp. Mainly distributed in the northern boreal zone (Brodo & Hawksworth 1977).

Specimen examined: **CHILE**, Maule Region, Talca Province, National Reserve "Altos de Lircay", 35°36′08.2″S 71°02′56.7″W, alt. 1367 m a.s.l., on bark, 26 January 2012, J.-S. Hur CL-120099-1 (KoLRI 014265).

Remarks: The only *Bryoria* species previously reported in Chile is *B. chalybeiformis* (Galloway & Quilhot 1998), which grows on rock or soil, without soralia but with spinulose branches, its color is much darker, and it is shiny. *Bryoria simplicior,* which might also be confused with *B. lanestris,* can be distinguished by its roundish and greenish black soralia that are broader than the branch and by its lack of compounds.

Buellia disciformis (Fr.) Mudd Fig. 1c, d

Thallus crustose, thin and rimose, immersed or superficial, surface pale white to whitish green, prothallus present when meeting with other thalli, black. Apothecia lecideine, disc black and plane, without pruina, with smooth margin, 0.2–0.4 mm in diam., spores 8 per ascus, brown, 1-septate, 14–21 × 6–9 μm.

Chemistry: Thallus K+ yellow, containing atranorin (by TLC).

Habitat: On bark, mainly distributed in temperate areas (Bungartz et al. 2007)

Specimen examined: **CHILE**, Maule Region, Cauquenes Province, National Reserve "Los Ruiles", 35°49′49.3″S 72°30′25.5″W, alt. 342 m a.s.l., on bark, 28 January 2012, J.-S. Hur CL-120240 (KoLRI 014407).

Remarks: *Buellia disciformis* might be confused with some *Lecidella* species, which also grow on bark and are morphologically quite similar, but it can be distinguished by its brown septate spores and K+ yellow reaction (atranorin).

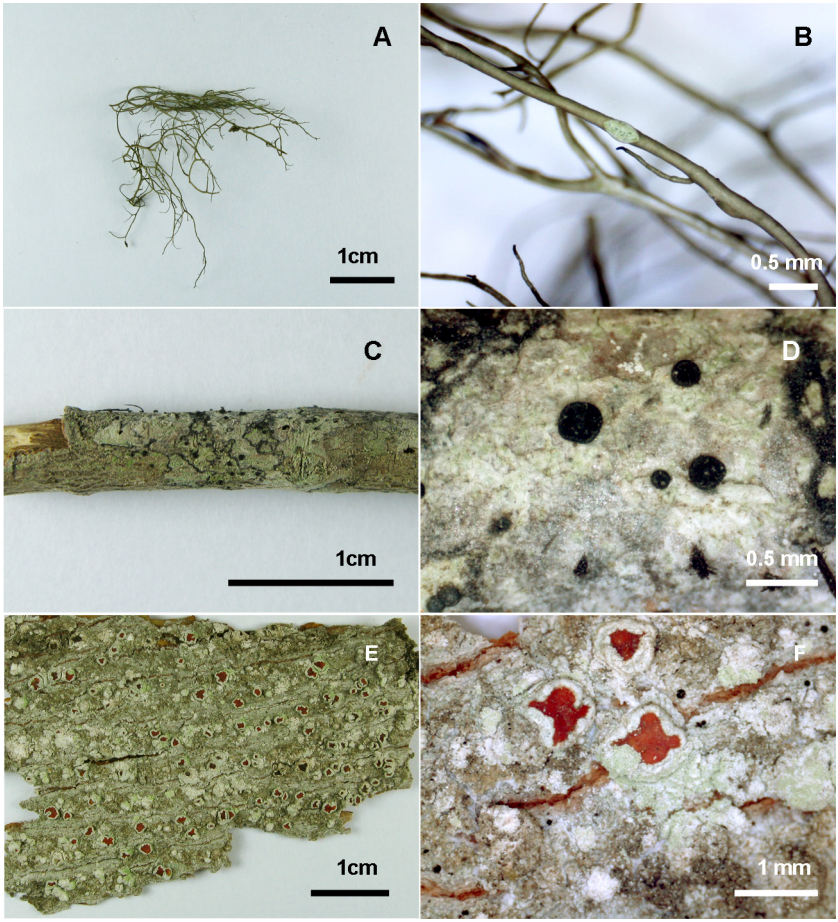

Fig. 1 Habit of lichens new to Chile. A–B. *Bryoria lanestris*. C–D. *Buellia disciformis*. E–F. *Haematomma sorediatum*.

Buellia chloroleuca could be easily confused with *B. disciformis*, but its distinctly C+ orange (xanthone) reaction readily distinguishes it.

Haematomma sorediatum R.W. Rogers Fig. 1e, f

Thallus crustose, white to greenish gray, granulose, soralia present, scattered on the surface of the thallus or on the margin of apothecia, orbicular, white. Apothecia lecanorine, up to 1 mm in diam., disc bright red, flat, epruinose, margin persistent, crenulate, spores 8 per ascus, hyaline, 7–12 septate, straight fusiform, 40–70 × 5–7 µm.

Chemistry: Thallus and soralia K+ yellow, C–, KC+ yellow, P+ pale yellow, containing atranorin and placodialic acid (by TLC).

Habitat: On bark. It has cosmopolitan distribution (Brodo et al. 2008).

Specimen examined: **CHILE**, Maule Region, Cauquenes Province, National Reserve "Los Ruiles", 35°50′02.4″S 72°′30′35.3″W, alt. 175 m a.s.l., 28 January 2012, J.-S. Hur CL-120158 (KoLRI 014324).

Remarks: The only *Haematomma* species from Chile can easily be separated from other species by its roundish soralia on the apothecial surface and margin and a red apothecial disc that is sometimes covered with pruina. Staiger & Kalb (1995) treated *H. neglectum* as a synonym of *H. sorediatum*, but Brodo et al. (2008) still had doubts about this. As the two species need more study, we use the name *H. sorediatum* here in the strict sense.

Lecidea capensis Zahlbr. Fig. 2a, b

Thallus squamulose to areolate, reddish brown to brown, smooth, convex, usually shiny, marginal part white, prothallus black, medulla I–. Apothecia black, round and subimmersed, pruinose, 0.5–1.3 mm in diam., hymenium 40–60 µm high, hyaline, epihymenium greenish black, spores ellipsoid, 10–14 × 3–4 µm.

Chemistry: Thallus and medulla all negative in spot reaction, containing 2'-O-methylperlatolic acid (by TLC).

Habitat: On rock, known from coastal forest and South Africa and Australia (Galloway 2007).

Specimen examined: **CHILE**, **Bío-Bío Region**, Chillán Province, vicinity of Termas de Chillán, 36°54′21.6″S 71°24′05.5″W, alt. 1980 m a.s.l., 3 February 2012, J.-S. Hur CL-120360 (KoLRI 014529).

Remarks: The species is characterized by saxicolous habit and a convex shiny thallus that is areolate and pale brown to reddish brown. It is similar to *L. fuscoatrula*, which differs in its I+ violet medulla reaction, smaller (<10 µm) ascospores, dark brown hymenium, and 2'-O-methylmicrophyllinic acid as the main compound.

Punctelia rudecta (Ach.) Krog Fig. 2c, d

Thallus foliose, greenish gray, lobes plane and linear, 3–7 mm wide, covered with white pseudocyphellae, irregular in shape, isidia mostly on the central part of the thallus, simple or branched, sometimes lobule-like, brown-tipped, lower surface pale brown, with light brown rhizines, simple or forked. Apothecia not seen.

Chemistry: Thallus K+ yellow, C–, medulla K–, C+ red, containing atranorin and lecanoric acid (by TLC).

Habitat: On rock; common in North America, Europe, Australia, and Asia (Egan & Aptroot, 2004)

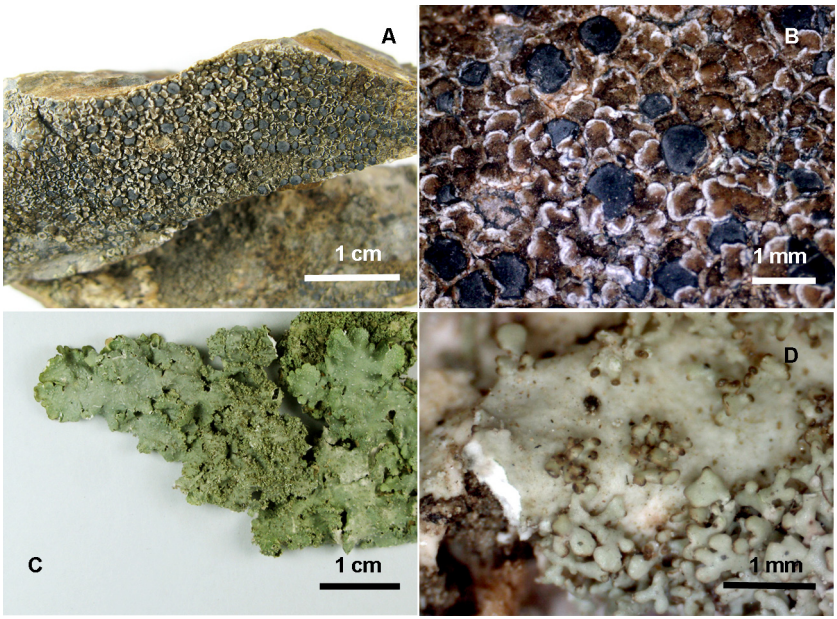

Fig. 2 Habit of lichens new to Chile. A–B. *Lecidea capensis*. C–D. *Punctelia rudecta.*

Specimen examined: **CHILE**, Maule Region, Cauquenes Province, National Reserve "Los Ruiles", 35°50′02.4″S 72°30′35.3″W, alt. 175 m a.s.l., 28 January 2012, J.-S. Hur CL-120142 (KoLRI 014308).

Remarks: This is the only *Punctelia* species with isidia reported from Chile. It is similar to *P. borreri,* which has soredia on the lobe margins instead of isidia. As all other *Punctelia* species reported in Chile before have soralia, they can easily be separated from *P. rudecta.* It is common and widespread in eastern and southeastern North America (Brodo et al. 2001).

Acknowledgments

This work was supported by: Instituto Biología Vegetal y Biotecnología and Instituto de Química de Recursos Naturales, Universidad de Talca, Chile; the National Research Foundation of Korea (No. 2011-0030491); and the foundation of Key Laboratory of Biodiversity and Biogeography, Kunming Institute of Botany, CAS (KLBB-201210) and National Natural Science Foundation of China (No. 31170023, KSCX2–EW–Z–9, Y3216111W1).

Literature cited

Brodo IM, Hawksworth DL. 1977. *Alectoria* and allied genera in North America. Opera Botanica 42: 1-164.

Brodo IM, Sharnoff D, Sharnoff S. 2001. Lichens of North America. New Haven: Yale University Press. 795 p.

Brodo IM, Culberson WL, Culberson CF. 2008. *Haematomma* (*Lecanoraceae*) in North and Central America, including the West Indies. The Bryologist 111(3): 363–423. http://dx.doi.org/10.1639/0007-2745(2008)111[363:HLINAC]2.0.CO;2

Bungartz F, Nordin A, Grube M. 2007: *Buellia*. 113-179, in: TH Nash III et al. (eds). Lichen Flora of the Greater Sonoran Desert Region. Volume 3. Lichens Unlimited, Arizona State University, Tempe..

Egan RS, Aptroot A. 2004. *Punctelia*. 431-436, in: TH Nash III et al. (eds). Lichen Flora of the Greater Sonoran Desert Region, Vol. 2. Lichens Unlimited, Arizona State University, Tempe, Arizona.

Elix JA, Johnston J, Parker JL. 1987. A catalogue of standard thin layer chromatographic data and biosynthetic relationships for lichen substances. Canberra: Australian National University.

Galloway DJ. 2007. *Lecidea* Ach. 1803. 740–787, in: Flora of New Zealand. Lichens. Revised Second Edition including Lichen-Forming and Lichenicolous Fungi. Vol. 1. Manaaki Whenua Press, Lincoln, New Zealand.

Galloway DJ, Quilhot W. 1998. Checklist of Chilean lichen-forming and lichenicolous fungi. Gayana Botanica 55(2): 111–185.

Orange A, James PW, White FJ. 2001. Microchemical methods for the identification of lichens. London: British Lichen Society.

Staiger B, Kalb K. 1995. *Haematomma*-Studien. I. Die Flechtengattung *Haematomma*. Bibliotheca Lichenologica 59: 1–198.

White FJ, James PW. 1985. A revised guide to the microchemical techniques for the identification of lichen substances. British Lichen Society Bulletin 57: 1–41.